

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

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# MULTIMEDIA UNIVERSITY

## FINAL EXAMINATION

TRIMESTER 3, 2017/2018

### DCA5018 – ELECTRIC CIRCUITS

(Diploma in Electronic Engineering)

31 MAY 2018  
9.00 a.m – 11.00 a.m  
(2 Hours)

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#### INSTRUCTIONS TO STUDENT

1. This question paper consists of 4 pages with 4 questions.
2. Answer **ALL** questions. All necessary working steps must be shown.
3. Please write all your answers in the answer booklet provided.

**QUESTION 1 [25 MARKS]**

For the circuit shown in Figure 1, calculate the following:

- a) The total resistance. [4 marks]
- b) Current  $I_1$ ,  $I_2$  and  $I_3$  [8 marks]
- c) Current flowing through each resistor [3 marks]
- d) Voltage across each resistor. [6 marks]
- e) Power dissipated at each resistor. [4 marks]

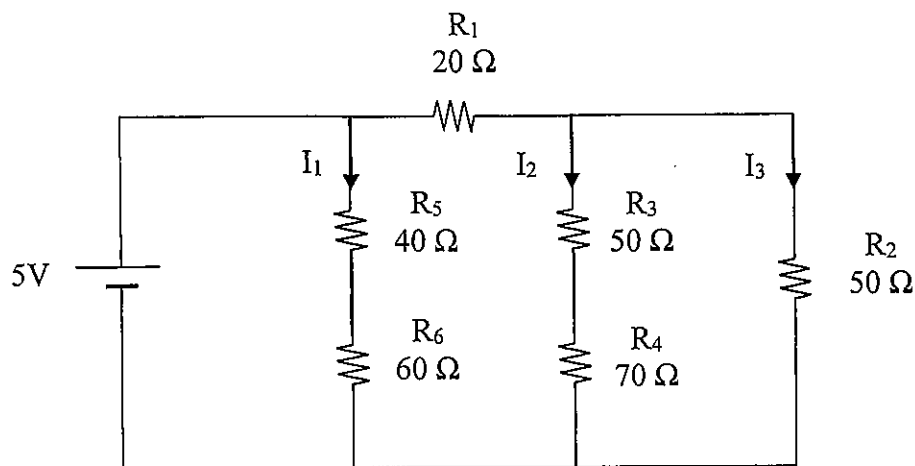


Figure 1

**Continued...**

**QUESTION 2 [25 MARKS]**

a) Referring to Figure 2, calculate the following by using respective theorem.

i) Norton's Resistance ( $R_N$ ) and Norton's Current ( $I_N$ ). Draw the equivalent circuit. [10 marks]

ii) Thevenin's Resistance ( $R_{TH}$ ) and Thevenin's Voltage ( $V_{TH}$ ). Draw the equivalent circuit. [10 marks]

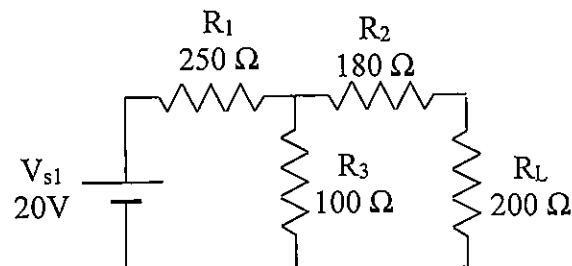


Figure 2

b) By using Mesh Current Analysis method, write the loop equations involved in Figure 3.

[5 marks]

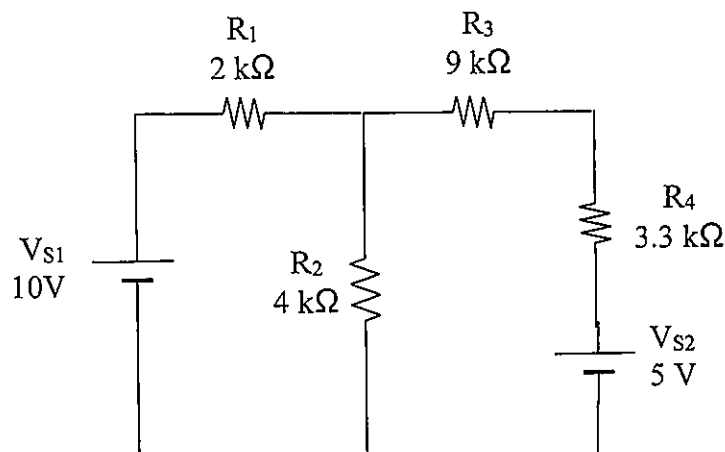


Figure 3

Continued...

**QUESTION 3 [25 MARKS]**

By referring to the RLC circuit as shown in Figure 4:

- a) Sketch the equivalent circuit representation in frequency domain.

[6 marks]

- b) Calculate the total impedance in the circuit. Also sketch the impedance phasor diagram.

[7 marks]

- c) Calculate the steady state current  $i(t)$ ,  $i_1(t)$ , and  $i_2(t)$  in the circuit.

[12 marks]

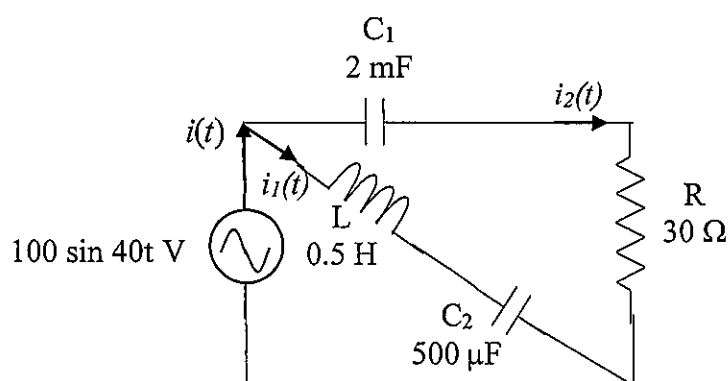


Figure 4

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**QUESTION 4 [25 MARKS]**

a) With an assistance of a formula, define Ohm's law. [3 marks]

b) Derive the following formula for an ideal (no resistance) parallel resonant circuit.

$$f_r = \frac{1}{2\pi\sqrt{LC}}$$

[6 marks]

c) Referring to Figure 5, an inductor is in storage energy cycle. Calculate the following.

i) Final steady state value of the current. [3 marks]

ii) Time constant of the RL series circuit. [3 marks]

iii) Transient time of the RL series circuit. [2 marks]

iv) Value of the inductance voltage after 10 ms. [4 marks]

v) Value of the circuit current 20 ms after the switch is closed [4 marks]

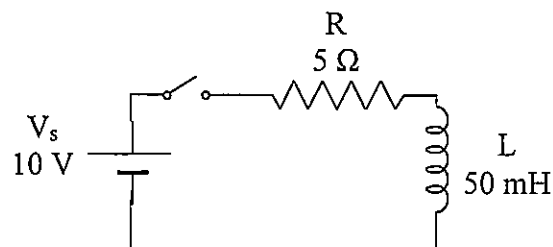


Figure 5

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